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Machine Learning based Automatic Personality Detection System

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Abstract - Nowadays with the development in artificial intelligence field, the automatic analysis of video interviews to recognize individual personality traits have reduced many problems.AI has applications in personality computing as well as psychological evaluation. With built-in Google Assistant, Amazon Alexa capabilities and LG's ThinQ deep learning AI technology, the voice agent is more intelligent, simpler and easier to use. Whether you are ordering food, searching YouTube or checking the weather, AI makes it easier to access the tools and media we like. In this project we have developed an AI interviewing system that one looks to hire employee in a particular company using CNN models and a Tensorflow engine. The system will simply recognize human nonverbal cues like attribute and posture. Features are then extracted from the AVI's.Automatic character development has been performed dependent on the extracted features preparing character scores from the appearances and polls of some of the candidates. Our study also indicates that even though the machine learning was conducted without large-scale data, the semi supervised DL approach performed surprisingly well with regard to automatic personality recognition despite the lack of labor-intensive manual annotation and labeling. The AI interview agent can be useful to replace existing assessment methods. This will also be helpful to achieve socially desirable effects in the new online Interview management system.

Key Words: CNN Algorithm, Random Forest, TensorFlow, Machine Learning, Support Vector Machine

1. INTRODUCTION

Personality is majorly a global predictor that is used in the employment section. This research is found out by Industrial and Organizational Psycologists. Some of the employer's use surveys will are self-reported to measure a candidate's personality. But it was found out that some of the applicants lied when participated in the survey so that they get better job opportunities. Some employeers evaluate candidate based on the nonverbal cues or the facial expressions in the interview. But in today's condition it is not possible for every person to attend a live job interview in person due to cost and time limitations. Asynchronous video interview (AVI) software's can be used to automatically interview applicants at one point in time. This approach will allow employers to review interview at a later point in time. Also employeers can show the recorded interview to any person who wants to see the candidates interview. When using Asynchronous Video Software, human raters find it challenging to correctly evaluate applicant's personality trait by watching recorded videos of the interview. Both Industrial and organizational psychologists recommended that Artificial Intelligence may outperform people in predicting or recognizing the personality of the applicant. It will be useful for screening job applicants on the grounds that applying AI techniques to audio-video datasets so that they can achieve more prediction than the human raters.AI is "the science and engineering of making the machines intelligent". They can independently plan and decide sequences of steps to achieve a specified goal without micro-management. Machine Learning(ML) is the part of AI studying how computer agents can improve their perception, knowledge, thinking, or action based on experience or data. Machine Learning can be divided into supervised learning, unsupervised learning, and semi-supervised learning. In supervised learning computer learns to predict human given labels. They are conducted using predefined labelled data. Unsupervised learning does not require labels. It can automatically make its own prediction without requiring predefined labels. Semi-supervised learning combines two approaches by using smaller amounts of unlabelled data plus some labelled data for pattern recognition. Therefore, this approach can reduce labeling efforts yet still achieve high precision. Previously, APR studies were developed based on supervised Machine Learning, which had involved labelling work done manually was very time consuming. Because convolutional neural networks have been proven to be high-performing models that can automatically process images and infer first impressions from camera images, this examination implemented semi-supervised DL methods, including CNNs, to develop an Interview Agent that can recognize applicant's personality by using latest dataset of the applicants facial expressions.

2. BACKGROUND

Structured interviews are more reliable and valid than unstructured interviews. Structured interview process, interview questions are specified beforehand, and all are asked the same set of questions and are scored based on the same scales. Facial expression is universal and conveys human emotions that can be recognized by computers with a high degree of accuracy. A study by showed that AI can be used to extract and analyse nonverbal signals to predict an individual's communication skills. The Indian IT sector becoming one of the top most recruitment sector in the world. It contributes about 7.52% of our Gross Domestic Product. The framework which we have designed is initially concerned with the IT sector of our country. It will mainly bargain the IT sector in India. Our Product can be stretched

out to various other commercial sectors, where intake and elimination are in mass like for Government Jobs. Personality and the skills of a person are most vital factors of the employee which is valuable to improve performance and reputation of the company. So, scope of this project is extremely valuable for the HR division of the company to do investigations of the emotions on the face in video interviews which will breakdown the framework. Interpersonal skills as well as personality traits have been identified as achievement factors for job performance and organization effectiveness. Nonverbal cues like facial expressions, tone, posture are useful for understanding emotions and attitude of the participant. So for this purpose we have generated new approach using different kinds of machine learning models.

Earlier, in an organization HR used to invite candidates for recruitment. They will examine the resume then match the skill set of the candidate with the requirements in the organization. In our proposed system we are developing personality detection system using asynchronous video analysis. In our project we have used tensorflow libraries as well as machine learning models like naïve byes, support vector and random forest to classify the resume of the candidate and also for tone analysis. So that system will automatically suggest suitable job for the candidate. For face analysis with CNN algorithm, landmarks will be captured by camera and features like smile, entertaining face, confused, upbeat face etc will be extracted and later trained.

3. METHODOLOGY

This project we will develop using Python and its inbuilt library TensorFlow. We will develop web application as a model within we will show our project as a model. For continue classification and tone analysis we will utilize machine learning algorithm like Naive bayes, SVM or random forest. Using CNN algorithm and face landmarks we separate the component of the face which is the video. Face categories like cheerful face, entertaining face, good signal, good smile and so forth will be added and trained with convolution neural network. Effectiveness with the organization will be investigated. For checking the performance of interview client should have register and login in our framework.

Support vector machines (SVMs) are a set of supervised learning methods used for classification, regression and outliers detection. SVC, NuSVC and LinearSVC are classes equipped for performing binary and multi-class classification on a dataset.

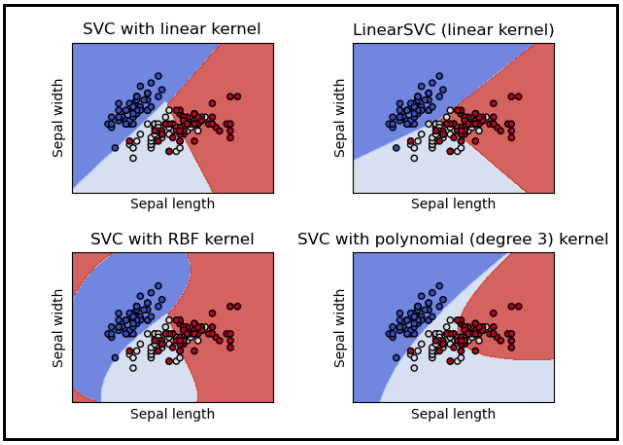

Fig -1: SVM Classification

A Naive Bayes classifier is a probabilistic machine learning model that is utilized for classification task. The essence of the classifier depends on the Bayes theorem. Naive Bayes algorithms are mostly utilized in sentiment analysis, spam filtering, recommendation frameworks and so forth They are quick and simple to implement yet their biggest disadvantage is that the requirement of predictors to be independent. In most of the genuine cases, the predictors are needy, this hinders the performance of the classifier. Random Forest classifier is a troupe strategy that prepares a few choice trees in corresponding with bootstrapping followed by collection, together alluded as sacking. Bootstrapping demonstrates that few individual choice trees are prepared in equal on different subsets of the preparation dataset utilizing various subsets of accessible highlights.

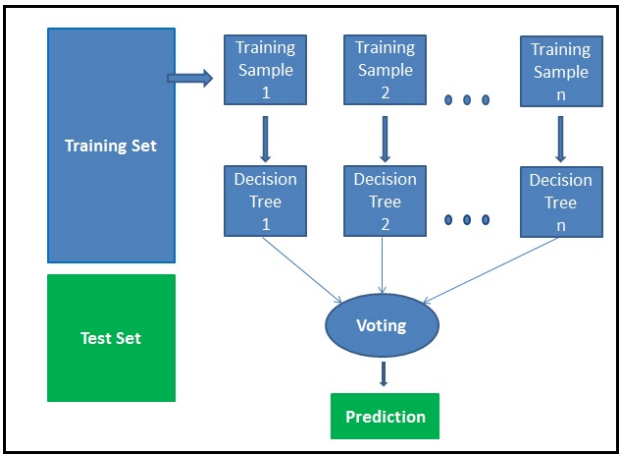

Fig -2: Prediction in Random Forest Algorithm

4. DESIGN AND ANALYSIS

Modules of APR:

The framework module comprises of a User module and admin module.

1. User Module-The user login would be utilized by the candidates to check their character. Client endeavors survey sees the Results. Up-and-comer needs to make and present their CV by filling the CV structure. The CV arrangement ought to be done appropriately determined by the framework. The admin login would be utilized by the selecting organization to check the character and Technical expertise of the up-and-comer the administrator can see every one of the enrolled up-and-comer's subtleties.

2. Admin Module-The Admin can see the consequences of the individual applicants which can be simple for the administrator to choose the ideal up-and-comer. The subtleties of the applicant in outcomes page incorporate name, age, address, character and his/her significant specialized expertise for enrolment after effective transfer of the CV, the up-and-comer can continue with the online test dependent on character.

CONCLUSIONS

This project is for personality computing. In traditional personality computing, validating APR using manually labelled features from any possible detectable distal cues was quite complicated.

This project developed an AVI embedded with a TensorFlow-based semi-supervised DL model to accurately auto-recognize an interviewee's true job applicants. Our APR approach achieved an accuracy above 90%, outperforming previous related laboratory studies whose accuracy ranged between 61% and 75% in the context of nonverbal communication. The high-performing APR used in this AVI can be adopted to supplement or replace self-reported personality assessment methods that can be distorted by job applicants due to the effects of social desire to be selected for employment.

Previous related studies have found that multimodal features (image frames and audio) learned by deep neural networks can deliver better performances in predicting the big five traits than can unimodal features.

FUTURE WORK

In future work, we may combine our visual approach with prosodic features to learn how to recognize an interviewee's personality. Moreover, this study utilized a specific type of professional as participants, which may limit the generalizability of these experimental results. Future research should include a more diverse participant population.

In future modification, we will use different machine learning algorithm will use for improve accuracy of the result. For face analysis add more face landmarks for generating model which will help for getting result. Also compare result with other algorithm and use best algorithm in System.

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